

Patent Application  
Attorney's Doc. No. 5038-147

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Daniel G. Schkolnik

Serial No.: 10/000,422

Group Art Unit: 2674

Filed: October 31, 2001

Examiner: Duc Q. Dinh

For: OPTICAL WINDOW FOR GENERATING WAVEFORMS

Commissioner for Patents  
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DECLARATION UNDER RULE 37 C.F.R. 1.132

I, Scott A. Pahl, do hereby declare the following:

1. My educational background consists of obtaining a Bachelor of Science degree in Applied Physics from the California Institute of Technology in 1982. I obtained a Ph.D. in Biomedical Engineering from the University of Texas at Austin in 1988.
2. My professional experience spans a period of time over 16 years. More specifically, I have worked as a Research Fellow, Instructor, Senior Research Scientist, Assistant Professor and Research Assistant Professor.
2. I am co-author of 39 Referced Papers, four (4) Book Chapters and 31 Abstracts; co-participant in 52 Conference Proceedings; eight (8) Supervised Theses; and co-inventor of four (4) U.S. patents. Attached hereto as Exhibit A is the Curriculum Vitae of the undersigned, supporting his educational and professional involvement in the field of biomedical optics.

3. This patent application describes aperture shapes for use in the optical wheels of optical mice. As a mouse moves, the optical wheel rotates and light from an LED is successively blocked and transmitted by apertures, thereby creating a stroboscopic effect. The flickering light is sensed by an optical detector which produces a temporal waveform. Waveforms which are closer to square waves are most desirable for detecting movement since rapid transitions improve the precision with which the location of the mouse can be determined.

4. Rectangular apertures in the optical wheel are common in optical mice. Improving the temporal waveforms is currently done by electronic waveform processing. Redesigning the optical aperture will improve the raw signal and may even obviate some or all of the electronic waveform processing.

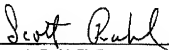
5. Matching an aperture shape to the incident light distribution is a common technique to produce a more uniform spatial spot. However, in this application, the aperture is designed to produce a more uniform temporal signal. The shape is optimized to enhance the rate at which the detected optical signal changes as the aperture moves in and out of the optical pathway between the LED and detector. The specific shape of the aperture is central to the utility of the invention - a circular aperture would maximize transmission, but would smooth the waveform and decrease the rate of transition.

6. It is not immediately obvious that the hourglass shape will improve the shape of the waveform. By making the top and bottom of the hourglass aperture wider, the precision of location would decrease. It is only in combination with the narrow waist of the hourglass aperture along the optical access that an improved waveform will result.

7. One could, in principle, use a narrower rectangular aperture, to improve the waveform shape, but this shape will not be as power efficient as the hourglass aperture, because more dim light will be collected. Another possible advantage of the hourglass shape, is that the hourglass shapes are likely to have fewer spurious optical diffraction effects than simple rectangular shapes. Optical diffraction will only add noise to the waveform.

I, the undersigned, declare that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true; and further, that these statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

DATED this 12<sup>th</sup> day of January, 2005.

  
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Scott A. Pahl, Ph.D.

Date prepared: 4/04

**Name**

Scott Pahl, Ph.D. Assistant Professor

**Education**

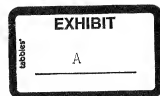
California Institute of Technology	1982	B.S.	Applied Physics
University of Texas at Austin	1988	Ph.D.	Biomedical Engineering

**Professional Experience**

1988 - 1989	<i>Research fellow, Academic Medical Center, Amsterdam</i>
1990 - 1991	<i>Research fellow, Massachusetts General Hospital, Boston</i>
1991 - 1993	<i>Instructor, Harvard Medical School, Boston</i>
1993 - Present	<i>Senior Research Scientist, Oregon Medical Laser Center, Portland</i>
1993 - Present	<i>Assistant Professor, Oregon Graduate Institute, Portland</i>
1993 - Present	<i>Research Assistant Professor, Oregon Health Sciences University, Portland</i>

**Awards and Other Professional Activities**

1991	Dermatology Foundation Award
1995 - Present	Editorial Board, Lasers in Medicine and Surgery
1995 - Present	Physics Chairman, Oregon Academy of Science
2001	Distinguished Teaching Award - Oregon Graduate Institute



## Refereed Papers

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## Book Chapters

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